

1 1. A method of communicating content, the method comprising:
2 automatically determining an available bandwidth between a recipient and a provider;
3 selecting content to be communicated between the recipient and the provider based on
4 the available bandwidth determined; and
5 communicating the content selected between the provider and the recipient.

1 2. The method of claim 1 wherein the available bandwidth is determined
2 automatically using at least one iteration comprising:
3 transmitting a predetermined amount of data to the recipient;
4 monitoring an amount of time taken for the predetermined amount of data to be
5 received by the recipient; and
6 calculating the available bandwidth based on the predetermined amount of data and
7 the amount of time taken for the data to be received by the recipient.

1 3. The method of claim 2 wherein transmitting the data comprises transmitting
2 an amount of data determined based on a prediction of a communication device used by the
3 recipient to communicate.

1 4. The method of claim 2 wherein automatically determining the available
2 bandwidth further comprises:
3 transmitting information indicating the amount of data being communicated to the
4 recipient,
5 wherein calculating the available bandwidth comprises calculating the available
6 bandwidth at the recipient based on the information indicating the amount of data
7 communicated and the amount of time for the transmission.

1 5. The method of claim 2 wherein calculating the available bandwidth comprises
2 calculating the available bandwidth at the provider based on the amount of data and the
3 amount of time for the transmission.

1 6. The method of claim 1 wherein automatically determining the available
2 bandwidth comprises:

3 transmitting a predetermined amount of data to the recipient;
4 re-transmitting the predetermined amount of data to the provider;
5 monitoring an amount of time taken for the predetermined amount of data to be
6 received by the recipient, re-transmitted to the provider, and received by the provider; and
7 calculating the available bandwidth based on the predetermined amount of data and
8 the amount of time taken for the data to be received by the recipient, re-transmitted to the
9 provider, and received by the provider.

1 7. The method of claim 6 wherein automatically determining the available
2 bandwidth further comprises:

3 transmitting information indicating the amount of data being communicated to the
4 recipient;
5 wherein calculating the available bandwidth comprises calculating the available
6 bandwidth at the recipient based on the information indicating the amount of data
7 communicated and the amount of time taken for the data to be received by the recipient, re-
8 transmitted to the provider, and received by the provider.

1 8. The method of claim 6 wherein calculating the available bandwidth comprises
2 calculating the available bandwidth at the provider based on the amount of data and the
3 amount of time taken for the data to be received by the recipient, re-transmitted to the
4 provider, and received by the provider.

1 9. The method of claim 2 wherein automatically determining the available
2 bandwidth further comprises:

3 adjusting the predetermined amount of data based on the available bandwidth
4 calculated; and
5 repeating the iteration using the adjusted predetermined amount of data.

1 10. The method of claim 9 wherein adjusting the predetermined amount of data
2 comprises increasing the predetermined amount of data.

1 11. The method of claim 9 wherein adjusting the predetermined amount of data
2 comprises decreasing the predetermined amount of data.

1 12. The method of claim 1 wherein automatically determining the available
2 bandwidth comprises automatically detecting the available bandwidth between the recipient
3 and the provider.

1 13. The method of claim 1 wherein automatically determining the available
2 bandwidth is performed when the recipient initially establishes communications with the
3 provider.

1 14. The method of claim 1 wherein automatically determining the available
2 bandwidth is performed when the recipient requests content from the provider after the
3 recipient initially establishes communications with the provider.

1 15. The method of claim 1 wherein selecting content comprises selecting among
2 content of varying richesses based on the available bandwidth determined.

1 16. The method of claim 1 wherein selecting content comprises selecting among
2 content of varying formats based on the available bandwidth determined.

1 17. The method of claim 16 wherein selecting among content of varying formats
2 comprises selecting between at least content in a still picture format and content in a video
3 format depending upon the available bandwidth determined.

1 18. The method of claim 1 wherein the recipient is a client and the provider is a
2 host.

1 19. The method of claim 1 wherein the recipient is a host and the provider is a
2 client.

1 20. The method of claim 1 wherein the recipient and the provider are both client
2 devices.

1 21. The method of claim 20 wherein the recipient and the provider are both
2 capable of peer-to-peer communications.

1 22. The method of claim 1 wherein automatically determining an available
2 bandwidth includes automatically detecting the available bandwidth several times during one
3 communication session between the recipient and the provider.

1 23. The method of claim 1 wherein automatically determining an available
2 bandwidth includes automatically determining the available bandwidth over a channel
3 accommodating communications from the recipient to the provider and separately
4 automatically determining the available bandwidth over a channel accommodating
5 communications from the provider to the recipient.

1 24. The method of claim 1 wherein automatically determining an available
2 bandwidth includes automatically determining the available bandwidth over multiple
3 channels between the recipient and the provider.

1 25. The method of claim 24 wherein automatically determining the available
2 bandwidth over multiple channels includes automatically determining the available
3 bandwidth simultaneously over multiple channels between the recipient and the provider.

1 26. The method of claim 24 further comprising selecting differing content to be
2 communicated over the multiple channels between the recipient and the provider based on
3 the available bandwidth determined over the multiple channels.

1 27. The method of claim 1 wherein automatically determining an available
2 bandwidth includes automatically determining the available bandwidth simultaneously from
3 the provider to the recipient and from the recipient to the provider.

1 28. A computer program for communicating content, the computer program being
2 stored on a computer readable medium or a propagated signal and comprising:
3 an automatic determining code segment that causes the computer automatically to
4 determine an available bandwidth between a recipient and a provider;
5 a selecting code segment that causes the computer to select content to be
6 communicated between the recipient and the provider based on the available bandwidth
7 determined; and
8 a communicating code segment that causes the computer to communicate the content
9 selected between the provider and the recipient.

1 29. The computer program of claim 28 wherein the automatic determining code
2 segment causes the computer to perform an iteration comprising:
3 a transmitting code segment that causes the computer to transmit a predetermined
4 amount of data to the recipient;
5 a monitoring code segment that causes the computer to monitor an amount of time
6 taken for the predetermined amount of data to be received by the recipient; and
7 a calculating code segment that causes the computer to calculate the available
8 bandwidth based on the predetermined amount of data and the amount of time taken for the
9 data to be received by the recipient.

1 30. The computer program of claim 29 wherein the transmitting code segment
2 causes the computer to transmit an amount of data determined based on a prediction of a
3 communication device used by the recipient to communicate.

1 31. The computer program of claim 29 wherein the automatic determining code
2 segment comprises:
3 a transmitting code segment that causes the computer to transmit information
4 indicating the amount of data being communicated to the recipient,
5 wherein the calculating code segment causes the computer to calculate the available
6 bandwidth at the recipient based on the information indicating the amount of data
7 communicated and the amount of time for the transmission.

1 32. The computer program of claim 29 wherein the calculating code segment
2 causes the computer to calculate the available bandwidth at the provider based on the amount
3 of data and the amount of time for the transmission.

1 33. The computer program of claim 28 wherein the automatic determining code
2 segment comprises:

3 a transmitting code segment that causes the computer to transmit a predetermined
4 amount of data to the recipient;

5 a re-transmitting code segment that causes the computer to re-transmit the
6 predetermined amount of data to the provider;

7 a monitoring code segment that causes the computer to monitor an amount of time
8 taken for the data of the predetermined size to be received by the recipient, re-transmitted to
9 the provider, and received by the provider; and

10 a calculating code segment that causes the computer to calculate the available
11 bandwidth based on the predetermined amount of data and the amount of time taken for the
12 data to be received by the recipient, re-transmitted to the provider, and received by the
13 provider.

1 34. The computer program of claim 33 wherein the automatic determining code
2 segment further comprises:

3 a transmitting code segment that causes the computer to transmit information
4 indicating the amount of data being communicated to the recipient,

5 wherein the calculating code segment causes the computer to calculate the available
6 bandwidth at the recipient based on the information indicating the amount of data
7 communicated and the amount of time taken for the data to be received by the recipient, re-
8 transmitted to the provider, and received by the provider.

1 35. The computer program of claim 34 wherein the calculating code segment
2 causes the computer to calculate the available bandwidth at the provider based on the amount
3 of data and the amount of time taken for the data to be received by the recipient, re-
4 transmitted to the provider, and received by the provider.

1 36. The computer program of claim 29 wherein the automatic determining code
2 segment further comprises:

3 an adjusting code segment that causes the computer to adjust the predetermined
4 amount of data based on the available bandwidth calculated; and

5 a repeating code segment that causes the computer to repeat the iteration using the
6 adjusted predetermined amount of data.

1 37. The computer program of claim 36 wherein the adjusting code segment causes
2 the computer to increase the predetermined amount of data.

1 38. The computer program of claim 36 wherein the adjusting code segment causes
2 the computer to decrease the predetermined amount of data.

1 39. The computer program of claim 28 wherein the automatic determining code
2 segment comprises an automatic detecting code segment that causes the computer to
3 automatically detect the available bandwidth between the recipient and the provider.

1 40. The computer program of claim 28 wherein the automatic determining code
2 segment causes the computer to determine automatically the available bandwidth when the
3 recipient initially establishes communications with the provider.

1 41. The computer program of claim 28 wherein the automatic determining code
2 segment causes the computer to determine automatically the available bandwidth when the
3 recipient requests content from the provider after the recipient initially establishes
4 communications with the provider.

1 42. The computer program of claim 28 wherein the selecting code segment causes
2 the computer to select among content of varying richesses based on the available bandwidth
3 determined.

1 43. The computer program of claim 28 wherein the selecting code segment causes
2 the computer to select among content of varying formats based on the available bandwidth
3 determined.

1 44. The computer program of claim 43 wherein the selecting code segment causes
2 the computer to select between at least content in a still picture format and content in a video
3 format depending upon the available bandwidth determined.

1 45. The computer program of claim 28 wherein the recipient is a client and the
2 provider is a host.

1 46. The computer program of claim 28 wherein the recipient is a host and the
2 provider is a client.

1 47. The computer program of claim 28 wherein the recipient and the provider are
2 both client devices.

1 48. The computer program of claim 47 wherein the recipient and the provider are
2 both capable of peer-to-peer communications.

1 49. The computer program of claim 28 wherein the automatic determining code
2 segment causes the computer to detect automatically the available bandwidth several times
3 during one communication session between the recipient and the provider.

1 50. The computer program of claim 28 wherein the automatic determining code
2 segment causes the computer to determine automatically the available bandwidth over a
3 channel accommodating communications from the recipient to the provider and separately to
4 determine automatically the available bandwidth over a channel accommodating
5 communications from the provider to the recipient.

1 51. The computer program of claim 28 wherein the automatic determining code
2 segment causes the computer to determine automatically the available bandwidth over
3 multiple channels between the recipient and the provider.

1 52. The computer program of claim 51 wherein the automatic determining code
2 segment causes the computer to determine automatically the available bandwidth
3 simultaneously over multiple channels between the recipient and the provider.

1 53. The computer program of claim 51 wherein the selecting code segment causes
2 the computer to select differing content to be communicated over the multiple channels
3 between the recipient and the provider based on the available bandwidth determined over the
4 multiple channels.

1 54. The computer program of claim 28 wherein the automatic determining code
2 segment causes the computer to determine automatically the available bandwidth
3 simultaneously from the provider to the recipient and from the recipient to the provider.

1 55. A system for communicating content, the system comprising:
2 an automatic determining component that is structured and arranged to determine
3 automatically an available bandwidth between a recipient and a provider;
4 a selecting component that is structured and arranged to select content to be
5 communicated between the recipient and the provider based on the available bandwidth
6 determined; and
7 a communicating component that is structured and arranged to communicate the
8 content selected between the provider and the recipient.

1 56. The system of claim 55 wherein the automatic determining component
2 performs an iteration comprising:
3 a transmitting component that is structured and arranged to transmit a predetermined
4 amount of data to the recipient;
5 a monitoring component that is structured and arranged to monitor an amount of time
6 taken for the predetermined amount of data to be received by the recipient; and
7 a calculating component that is structured and arranged to calculate the available
8 bandwidth based on the predetermined amount of data and the amount of time taken for the
9 data to be received by the recipient.

1 57. The system of claim 56 wherein the transmitting component is structured and
2 arranged to transmit an amount of data determined based on a prediction of a communication
3 device used by the recipient to communicate.

1 58. The system of claim 56 wherein the automatic determining component
2 comprises:

3 a transmitting component that is structured and arranged to transmit information
4 indicating the amount of data being communicated to the recipient,

5 wherein the calculating component is structured and arranged to calculate the
6 available bandwidth at the recipient based on the information indicating the amount of data
7 communicated and the amount of time for the transmission.

1 59. The system of claim 56 wherein the calculating component is structured and
2 arranged to calculate the available bandwidth at the provider based on the amount of data and
3 the amount of time for the transmission.

1 60. The system of claim 55 wherein the automatic determining component
2 comprises:

3 a transmitting component that is structured and arranged to transmit a predetermined
4 amount of data to the recipient;

5 a re-transmitting component that is structured and arranged to re-transmit the
6 predetermined amount of data to the provider;

7 a monitoring component that is structured and arranged to monitor an amount of time
8 taken for the predetermined amount of data to be received by the recipient, re-transmitted to
9 the provider, and received by the provider; and

10 a calculating component that is structured and arranged to calculate the available
11 bandwidth based on the predetermined amount of data and the amount of time taken for the
12 data to be received by the recipient, re-transmitted to the provider, and received by the
13 provider.

1 61. The system of claim 60 wherein the automatic determining component further
2 comprises:

3 a transmitting component that is structured and arranged to transmit information
4 indicating the amount of data being communicated to the recipient,

5 wherein the calculating component is structured and arranged to calculate the
6 available bandwidth at the recipient based on the information indicating the amount of data
7 communicated and the amount of time taken for the data to be received by the recipient, re-
8 transmitted to the provider, and received by the provider.

1 62. The system of claim 61 wherein the calculating component is structured and
2 arranged to calculate the available bandwidth at the provider based on the amount of data and
3 the amount of time taken for the data to be received by the recipient, re-transmitted to the
4 provider, and received by the provider.

1 63. The system of claim 56 wherein the automatic determining component further
2 comprises:

3 an adjusting component that is structured and arranged to adjust the predetermined
4 amount of data based on the available bandwidth calculated; and

5 a repeating component that is structured and arranged to repeat the iteration using the
6 adjusted predetermined amount of data.

1 64. The system of claim 63 wherein the adjusting component increases the
2 predetermined amount of data.

1 65. The system of claim 63 wherein the adjusting component decreases the
2 predetermined amount of data.

1 66. The system of claim 55 wherein the automatic determining component
2 comprises an automatic detecting component that is structured and arranged to detect
3 automatically the available bandwidth between the recipient and the provider.

1 67. The system of claim 55 wherein the automatic determining component is
2 structured and arranged to determine automatically the available bandwidth when the
3 recipient initially establishes communications with the provider.

1 68. The system of claim 55 wherein the automatic determining component is
2 structured and arranged to determine automatically the available bandwidth when the
3 recipient requests content from the provider after the recipient initially establishes
4 communications with the provider.

1 69. The system of claim 55 wherein the selecting component is structured and
2 arranged to select among content of varying richesses based on the available bandwidth
3 determined.

1 70. The system of claim 55 wherein the selecting component is structured and
2 arranged to select among content of varying formats based on the available bandwidth
3 determined.

1 71. The system of claim 70 wherein the selecting component is structured and
2 arranged to select between at least content in a still picture format and content in a video
3 format depending upon the available bandwidth determined.

1 72. The system of claim 55 wherein the recipient is a client and the provider is a
2 host.

1 73. The system of claim 55 wherein the recipient is a host and the provider is a
2 client.

1 74. The system of claim 55 wherein the recipient and the client are both client
2 devices.

1 75. The system of claim 74 wherein the recipient and the provider are both
2 capable of peer-to-peer communications.

1 76. The system of claim 55 wherein the automatic determining component is
2 structured and arranged to detect automatically the available bandwidth several times during
3 one communication session between the recipient and the provider.

1 77. The system of claim 55 wherein the automatic determining component is
2 structured and arranged to determine automatically the available bandwidth over a channel
3 accommodating communications from the recipient to the provider and separately to
4 determine automatically the available bandwidth over a channel accommodating
5 communications from the provider to the recipient.

1 78. The system of claim 55 wherein the automatic determining component is
2 structured and arranged to determine automatically the available bandwidth over multiple
3 channels between the recipient and the provider.

1 79. The system of claim 78 wherein the automatic determining component is
2 structured and arranged to determine automatically the available bandwidth simultaneously
3 over multiple channels between the recipient and the provider.

1 80. The system of claim 78 wherein the selecting component is structured and
2 arranged to select differing content to be communicated over the multiple channels between
3 the recipient and the provider based on the available bandwidth determined over the multiple
4 channels.

1 81. The system of claim 55 wherein the automatic determining component is
2 structured and arranged to determine automatically the available bandwidth simultaneously
3 from the provider to the recipient and from the recipient to the provider.